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aptitude for making personality studies,"—all of which is probably true, but could not be said truly of a study already upon its feet as a science. Perhaps, indeed, no science of human behavior is possible.

For this cause of disappointment the psychologist may well blame his own over-sanguine expectations, but for two others he may fairly hold the author to account. In the first place the work bears the marks of haste in preparation or at least of having missed a final revision. It is uneven in style; a paragraph here and there reads as if it had been incorporated without change from the author's notes of his reading and in consequence is difficult to understand without as full a knowledge of the original; others are clumsily worded and obscure without even this excuse. Superficial contradictions, too, occur here and there. We read, for example, on p. 81 that "there seems no evidence that warrants the attribution of any specific form of psychic activity to the cerebral cortex," but on p. 63 of "the higher complex faculties described as reason—a function of the cerebral cortex," and on p. 144 that "the higher cortical centers of the brain are those in which the mechanisms of self-consciousness are chiefly represented." On p. 147 we hear of "the vague self-consciousness which dawns at birth," but learn on p. 154 that "gradually . . . as the muscular system falls more and more under the control of the brain and both the sensing activities and their coordinations become greater, there emerges the complex of responses which we recognize as the first indication of the dawn of self-consciousness." These are rather trivial matters perhaps, but obscurity and carelessness help neither the reader nor the cause which Dr. Paton has at heart.

That Dr. Paton's psychological terminology would have been reformed in a last blue-penciling is by no means sure, but it is a pity that he could not have had at the critical moment the aid and comfort of some competent colleague. He would have learned that no psychologist writes of "sensing . . . ideas" (p. 118), or of a "sense of appreciation dependent upon the evaluation of muscular contractions" (p. 141) or of "a sense of credulity" (p. 327), and that no psychologist, except in joke, would give his endorsement to such a statement as that which is cited on p. 279, to wit, that "one-third of our mental make-up is instinct, one-third habit and one-third a process of becoming one or the other." Among the nearly 400 authors to whom Dr. Paton refers there are a goodly number of psychologists, but he has evidently proved immune to their manner of speech, if not also to their manner of thought.

When a science of human behavior comes, if it ever does, it will come as the joint work of the biologists and psychiatrists on one side and of psychologists and sociologists on the other, and each party will have to know well and give respectful attention to the work of the other. Dr. Paton presents us with an excellent account of the data which his side can now contribute. We trust that his acceptance of a place on the programme of the recent meeting of the American Psychological Association at Princeton argues an inclination on his part toward a better acquaintance with working psychologists and a more intimate knowledge of their science.

E. C. S.

*Psychology: A Study of Mental Life.* By ROBERT S. WOODWORTH. New York. Henry Holt & Co., 1921. Pp. x, 580.

In an easy and conversational style, Professor Woodworth presents in this book his idea of modern psychology, which, as he says in his opening sentence, "is an attempt to bring the methods of scientific investigation . . . to bear upon mental life and its problems." Abandoning the traditional isolation and independence of psychology as a separate science, he adopts the point of view that it is a department or branch of biology. He regards psychology as "the science of the conscious and

near-conscious activities of living individuals" (p. 17). The prototype of the conscious and near-conscious activities is the simple reaction, which is "a response to a stimulus" (p. 22). This schema of stimulus-response is of great systematic importance. It appears in the exposition of all the activities, the conscious and the near-conscious, the higher and the lower, the native and the acquired, and it forms the scaffolding of the entire work.

In the opening chapter, Woodworth describes the subject-matter, problem, and methods of psychology.

The subject-matter of psychology is the mental activities, which form a sub-class of the vital activities. The activities considered are those of individuals as distinct from those of groups and from those of single organs: a distinction which separates psychology from sociology on the one hand and from physiology on the other. The limiting adjective 'mental' is merely relative, for the near-conscious activities—those closely related to consciousness—belong properly to the subject-matter of psychology. Within these broad limitations the activities which psychology studies may be human or animal, adult or child, normal or abnormal.

The problem of psychology is threefold: to determine how individuals differ in their mental activities, how they resemble one another in their mental activities, and how the study of these differences and these likenesses may be put to practical ends.

The general methods of psychology are the experimental, comparative, genetic, and pathological. With every one of these two specific modes of approach may be followed: the introspective (the mode peculiar to the science of consciousness), and the objective (the mode peculiar to the science of behavior). Woodworth employs both.

With the field thus defined, "the next question is where to commence operations" (p. 21). The answer, of course, is "to start with the simplest sorts of mental performance, either with sensations, as do the introspective psychologists who think of sensations as the chief elements of which consciousness is composed, or with reflexes, as do the behaviorists who conceive of behavior as composed of these simple motor reactions" (p. 21). The cue is taken from the behaviorists "because the facts of motor reaction are more widely useful in our further studies than the facts of sensation, and because the facts of sensation fit better into the general scheme of reactions than the facts of reaction fit into any general scheme based on sensation" (p. 22). A further "advantage of basing our psychology on reactions is that it keeps us 'close to the ground', and prevents our discussions from sailing off into the clouds of picturesque but fanciful interpretation. Psychology is very apt to degenerate into a game of blowing bubbles, unless we pin ourselves down to hard-headed ways of thinking. The notion of a reaction is of great value here, just because it is so hard-headed and concrete" (p. 68).

The reaction is therefore accepted as the fundamental basis of psychology, and is defined as "a response to a stimulus." A stimulus is any force or agent that, acting upon the individual, releases energy stored in the organism; and a response in the simplest case is a muscular movement, in more complex cases any act of the individual organism: a feeling, sensing, doing, observing, knowing, inferring, etc.

Working from the simple to the complex, Woodworth in Chapter II considers the reflexes and other elementary forms of reaction, and then advances in Chapter III to the reactions of the higher levels. He argues that under his definition "there is no reason why we should not include a great variety of mental processes [sensations, perceptions, thoughts] under the general head of reaction" (p. 45).

In Chapter IV purposes, motives, interests, or tendencies (as they are more aptly called), which at first thought seem to transcend the 'stimulus-response' point of view, are reconciled to it. Woodworth finds that a pur-

pose is itself an inner response to some external stimulus, which persists for a time, and which acts in its turn as a central stimulus to further reactions.

With this "stock of methods and general concepts," Woodworth turns in Chapter V to the consideration of the case of democratic John Doe: which of his traits are native and which acquired? Proceeding upon the criterion of universality, that that trait which all individuals of the same descent show in common is native—unless evidence can be brought forward to the contrary (p. 98), Woodworth classifies the native traits as: reflex, instinct, emotion, feeling, sensation, attention, and intelligence. These traits he describes, so far as possible, from both the objective and the subjective points of view.

Reflex and instinct are described only from the objective side. The reflex is a motor or glandular response; the instinct is a motor or glandular tendency. Neither is conscious, but both are near-conscious in that they are somehow like the conscious.

Emotion is described from both points of view. On the objective side the emotion, which (as the inventory of the instincts and emotions in Chapter VIII shows) is closely bound up with instinct, is a neural response. It is the end-result of a number of internal and external preparatory acts of muscles, organs, and glands. On the subjective side it is closely bound up with impulse, with the conscious tendency of "wanting to do something." Considered apart from this tendency, however, emotion is a "conscious stir-up," a "feeling somehow," a "mass of sensations" aroused by objective bodily changes.

"Feeling is subjective and unanalyzed"; "it is simply the 'way you feel'" (p. 172). While conscious, it is not cognitive; for "as soon as you begin cognizing and say, 'I feel badly here or there, in this way or in that,' you know something about your subjective condition, but the feeling has evaporated for the instant." On the objective side "feeling is an impulse to 'stand pat' or to end the state;" it is, in other words, a specific neural tendency.

Sensation on the subjective side is bare conscious response. "The child does not learn to see or hear, though he learns the meaning of what he sees and hears. He gets sensation as soon as his senses are stimulated, but recognition of objects and facts comes with experience. Hold an orange before his open eyes and he sees, but the first time he doesn't see an orange. The adult sees an object, where the baby gets only sensation. 'Pure sensation,' free from all recognition, can scarcely occur except in the very young baby" (p. 187). On the objective side "sensation may be called the first response of the brain to the external stimulus." "Without the brain response, there is apparently no conscious sensation, so that the activity of the sense organ and sensory nerve is preliminary to the sensation proper." After describing the various sense organs and discussing the elementary sensations and their blends or compounds,—a discussion marked only by unqualified acceptance of the Ladd-Franklin theory of vision,—Woodworth turns to the consideration of adaptation, after-image, and contrast. This chapter on sensation, he tells us in the preface, "might perfectly well be omitted. . . . without appreciably disturbing the continuity of the rest."

"Attention is preparatory, selective, mobile, highly conscious." "To attend to a thing is to be keenly conscious of that thing, it is to respond to that thing and disregard other things, and it is to expect something more from that thing" (p. 244). Attention is a complex response. "Its natural stimulus is anything novel or sudden, its 'emotional state' is curiosity or expectancy, and its instinctive reaction consists of exploratory movements, its inherent impulse is to explore, examine, or await."

On the subjective side attention is highly conscious. "One of the surest of all introspective observations is that we are more conscious of

that to which we are attending than of anything else." On the objective side attention is a neural and motor reaction: neural, in so far as it is a mental activity; for degree of consciousness tallies, not with intensity of sensation or energy of muscular action, but with degree of mental activity; and motor, in so far as the movements that occur in attending to an object are such as to bring the sense-organs to bear on that object as efficiently as possible.

Intelligence comprises the organism's innate limitations and susceptibilities of reaction. On the subjective side intelligence is like reflex and instinct, *i. e.*, it is near-conscious. On the objective side it resembles instinct in that it is a native tendency; but instinct consists in ready-made native reaction-tendencies, whereas the intelligence of an individual at any age depends on what he has previously learned. It might appear from this statement that intelligence is not a native but an acquired trait; but, in fact, what the individual learns depends upon his retentivity, his responsiveness to relationships, his persistence, his submissiveness, his curiosity, and his special aptitudes.

The acquired reactions and tendencies to react—all knowledge, the whole stock of ideas and of motor skill, and certain motives and likes and dislikes—are modifications of the native forms just mentioned. In the next four chapters the processes of learning and acquiring these modifications are described. The first is devoted to the acquiring of motor habits and skill; the second, to memory; the third, to acquired mental reactions; and the fourth is given to association, to a consideration of the general laws of exercise and of combination which hold sway in the whole field of acquisition of reactions.

At this point the decision is reached that John Doe's "behavior is primarily instinctive or native, but that new attachments of stimulus and response, and new combinations of responses, acquired in the process of learning, have furnished him with such an assortment of habits of all sorts that we can scarcely identify any longer the native reactions out of which his whole behavior is built." Henceforth we must keep him under surveillance in order to see what use he makes of this vast stock of native and acquired reactions, how he behaves from day to day, and how he meets the exigencies of life (p. 419). Study reveals that "his life is a voyage of discovery and at the same time a career of invention" (p. 421).

The culmination of the process of discovery is perception. On the subjective side "it consists in responding to a stimulus by knowing some fact indicated by it either directly or indirectly" (p. 422). Sensation gives us the sign of some fact; perception, the meaning of the sign. On the objective side perception is a secondary response to a physical stimulus, being properly a direct response to the sensation. "The chain of events is: Stimulus, response of the sense organ and sensory nerve, first cortical response which is sensation, second cortical response which is perception" (p. 423). It is only, however, the simplest perception which is thus singly determined; ordinarily it takes a collection of stimuli to arouse a perception. This collection is at the same time a selection (under the laws of attention and association) from the whole mass of sensory stimuli acting at any moment on the individual. "Perception is at once an isolating and combining response" (p. 431). Reason is the counterpart of perception; "indeed in discussing reason we are still on the topic of perception." The reasoner is an explorer, and the goal of his exploration is the perception of some fact previously unknown to him. Two facts are present as stimuli, and the response, which on the subjective side is called inference, consists in perceiving a third fact that is implied in the two stimulus facts. "Inference, typically, is a response to two facts, and the response consists in perceiving a third fact that is bound up in the other two." On the objective side reasoning is the same as perception, a neural response of the cortical regions adjacent to the sensory areas.

From exploration and discovery, which are involved in perception and reason, we turn to manipulation and invention, which are involved in imagination. The stimulus consists of facts, either perceived at the moment or recalled from past perception, that are now freshly related or combined. The response may be divided into two phases: preliminary, receiving a combination of stimuli; and final, responding to the combination. Typically, the preliminary stage consists in the recall of facts previously perceived. The final stage is invention, which consists in a response to the novel combination of facts.

Will and Personality, the subjects of the closing chapters, are not psychological terms in so far as they are not special kinds of responses. Will refers to certain relationships in which a response may stand to other responses; personality, to the array of native and acquired traits. Under the heading 'Will' Woodworth discusses the various kinds of action and the practical applications of the subject, "how to get action either from yourself or from others." Under 'Personality' he discusses the factors involved, the development and expansion of the self, and the unconscious mind. In his consideration of the unconscious, he severely criticises the concepts and tenets of Freud and of the psychoanalytical school.

We have here an empirical biological system which has been cast in the mould of "stimulus-response," a mould which even cursory study reveals as inadequate. The concept is teleological throughout, and the logical consequences of interactionism can not be escaped.

Few definitions are attempted. Woodworth is satisfied for the most part to rely upon the common-sense appraisement of his terms. Where this seems inadequate, and he does attempt definition, the formulas are for the most part vague and uncertain. For example, the definition of reaction, the unique and fundamental concept of the system, is "a response to a stimulus." Yet nowhere do we find an exact definition of either of these terms. A stimulus is "any force or agent that acting upon the individual arouses a response;" but what, then, is a force or agent? is it physical or mental or physiological? and how does the undefined force or agent act, and what does it act upon? Woodworth replies that it acts upon the individual, but again he nowhere tells us what he means by an individual. What does the force do to this enigmatical individual? We are told that it "arouses a response." And response is described as any act of the individual organism aroused by a stimulus. Tautology, pure and simple! One member is defined in terms of the other. When we turn to the acts themselves, we find that acts of the muscles, glands, organs, end-organs, nerves, sensory centers, cortex, as well as stir-ups, wanting-to-do-something, feeling, sensing, highly conscious consciousnesses, observing, doing, knowing, inferring, inventing and modifying appear on the scene. But these activities belong to very different universes, and can be brought together under the concept of reaction only because of the looseness of the terms employed.

Psychology does not, however, include all the activities that can be grouped under the concept of stimulus-response, but only those that are "conscious or near-conscious," only those that come from "the organism or individual as a whole." Upon these principles, Woodworth excludes the activities of digestion, of the circulation, of the liver, etc. The limitation of subject-matter would be more comprehensible if "conscious" and "near-conscious" and "organism as a whole" were unequivocally defined. They are not; and we find that the author's exposition but adds to our perplexity. On p. 73 he illustrates the organic level of purposive behavior by reference to the stimulation of a single muscle, which by his own criteria must be physiological! Again it is difficult to see, on the basis of relation to consciousness, why he includes reflex, instinct and intelligence and excludes digestion, circulation and breathing. On the basis of

extent of activity, whether of a single organ or of the whole individual, the case is even more puzzling. The activity of the circulatory system, which extends throughout the entire body, is excluded, whereas the isolated pupillary reflex is included. It is also not easy to see why Woodworth includes emotion and attention among native traits. Emotion, he says, "consists wholly of the sensations of bodily changes." Why, then, is it listed as a separate trait? Why is it not included in the chapter on sensation and discussed as a blend? Elsewhere, we read that "all the emotions belong under the general heading of the feelings." Attention from the objective point of view gives us nothing new; it practically amounts to emotion, instinct and impulse. From the subjective point of view, however, we find that "we are more conscious of that to which we are attending than of anything else;" attention is a high degree of consciousness. Since degree of consciousness tallies, not with intensity of sensation or energy of muscular action, but with degree of mental activity (p. 266); and since mental activity is defined as conscious or near-conscious activity; it follows that attention is a high degree of consciousness which goes with a high degree of conscious or near-conscious activity.

The discussion of attention brings up the question of degree of consciousness. What does this expression mean? How can there be, for instance, degrees of consciousness in the field of sensation? This trait, be it remembered, is not cognitive. When we pass to the more complex levels, awareness and cognition appear, and degrees of consciousness find ready application. Still, even at the cognitive level, the concept is not without its pitfalls; it implies a permanent mind, a knower, and carries us back to the old 'self-activity' psychology. This implication is also present in Woodworth's concept of tendency. His exposition is straightforward and clear in the explanation of tendencies and the treatment of native traits; but in his discussion of the acquired traits and of the modifications which follow the laws of exercise and combination the implication of a permanent mind is very apparent. For example: how can use or exercise modify a native trait? Modification is explainable only by the tacit assumption of the middle term, the tendency, which is effective in both directions: toward the stimulus, in the substitution and detachment of the original stimulus; toward the response, in the substitution and combination of responses.

The style of the book is colloquial, facetious, and even slangy, as some of the excerpts already quoted show, and as the following remarks will further illustrate: "The dog passed another on the way without so much as saying 'How d'y'e do?'" "We had better fetch that law out again and put it in good repair and see whether it is adequate for the job that we now have on hand;" "Now bring in our trusty law of exercise;" "The law of combination seems to fill the bill very well;" "Errors of any kind are meat to the psychologists;" "Not that Freud would get our OK." It is at least doubtful whether this innovation is of advantage to a scientific text-book.

K. M. D.

*Die Grundlagen der psychischen Entwicklung. Eine Einführung in die Kinderpsychologie.* By K. KOFFKA. Osterwieck am Harz. 1921. Pp. viii+278.

This book is more than a restatement of facts and inferences regarding mental development and the psychology of childhood; it is a reinterpretation of the genesis of mind according to certain principles of mental structure which have grown out of the recent experimental work on *perception* undertaken by Köhler, Wertheimer, Koffka, and their collaborators. The new point of view is radical in its abandonment of the conscious element as a unit of structure, for with this go also the law of association,